WYSSLING CONSULTING
CORPORATE EXPERIENCE WITH SMALL BUSINESS VALUE
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June 23, 2022
Revised March 15, 2023

Illumine Industries
39111 Paseo Padre Parkway Suite 313
Fremont, CA 94538

Scott Wyssling, PE

Digitally signed by Scott Wyssling, PE
DN: C=US, S=Utah, L=Alpine, O=Wyssling Consulting, OU=Engineering, CN="Scott Wyssling, PE", E=swyssling@wysslingconsulting.com
Reason: I am the author of this document
Location: your signing location here
Date: 2023.03.15 09:59:17-06'00'
Foxit PDF Editor Version: 11.1.0

Re: Engineering Services
Ramirez Residence
38 Kirby Smith Circle, Spring Lake NC
10.800 kW System

To Whom It May Concern:

We have received information regarding solar panel installation on the roof of the above referenced structure. Our evaluation of the structure is to verify the existing capacity of the roof system and its ability to support the additional loads imposed by the proposed solar system.

### *A. Site Assessment Information*

1. Site visit documentation identifying attic information including size and spacing of framing for the existing roof structure.
2. Design drawings of the proposed system including a site plan, roof plan and connection details for the solar panels. This information will be utilized for approval and construction of the proposed system.

### *B. Description of Structure:*

***Roof Framing:*** Assumed prefabricated wood trusses at 24" on center. All truss members are constructed of 2x4 dimensional lumber.
***Roof Material:*** Composite Asphalt Shingles
***Roof Slopes:*** 27 degrees
***Attic Access:*** Inaccessible
***Foundation:*** Permanent

### *C. Loading Criteria Used*

- **Dead Load**
  - Existing Roofing and framing = 7 psf
  - New Solar Panels and Racking = 3 psf
  - TOTAL = 10 PSF
- **Live Load** = 20 psf (reducible) – 0 psf at locations of solar panels
- **Ground Snow Load** = 10 psf
- **Wind Load** based on ASCE 7-10
  - Ultimate Wind Speed = 119 mph (based on Risk Category II)
  - Exposure Category C

*Analysis performed of the existing roof structure utilizing the above loading criteria is in accordance with the 2018 North Carolina Residential Code, including provisions allowing existing structures to not require strengthening if the new loads do not exceed existing design loads by 105% for gravity elements and 110% for seismic elements. This analysis indicates that the existing framing will support the additional panel loading without damage, if installed correctly.*

***D. Solar Panel Anchorage***

1. The solar panels shall be mounted in accordance with the most recent K2 Systems installation manual. If during solar panel installation, the roof framing members appear unstable or deflect non-uniformly, our office should be notified before proceeding with the installation.
2. The maximum allowable withdrawal force for a M5 x 60mm lag screw is 213 lbs per inch of penetration as identified in the National Design Standards (NDS) of timber construction specifications. Based on two (2) screws with a minimum penetration depth of 1-5/8", the allowable capacity per connection is greater than the design withdrawal force (demand). Considering the variable factors for the existing roof framing and installation tolerances, the connection using two (2) M5 x 60mm lag screw with a minimum of 1-5/8" embedment will be adequate and will include a sufficient factor of safety.
3. Considering the wind speed, roof slopes, size and spacing of framing members, and condition of the roof, the panel supports shall be placed no greater than 48" on center.

Based on the above evaluation, this office certifies that with the racking and mounting specified, the existing roof system will adequately support the additional loading imposed by the solar system. This evaluation is in conformance with the North Carolina Residential Code, current industry standards and practice, and is based on information supplied to us at the time of this report.

Should you have any questions regarding the above or if you require further information do not hesitate to contact me.

Very truly yours,

Scott E. Wyssling, PE
North Carolina License No. 46546
North Carolina Firm No. P-2308

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NORTH CAROLINA PROFESSIONAL SEAL 046546 ENGINEER SCOTT E. WYSSLING

Wyssling Consulting, PLLC
76 N Meadowbrook Drive Alpine UT 84004
North Carolina COA # P-2308

Date Signed 3/15/2023

# NANCY RAMIREZ - 10.800kW DC, 10.000kW AC

## SHEET CATALOG

| INDEX NO. | DESCRIPTION |
|---|---|
| T-01 | COVER PAGE |
| S-01 | MOUNTING DETAIL |
| S-02 | STRUCTURAL DETAIL |
| E-01 | SINGLE LINE DIAGRAM |
| E-02 | THREE LINE DIAGRAM |
| E-03 | STRING WIRING DIAGRAM |
| PL-01 | WARNING PLACARDS |
| PL-02 | DIRECTORY PLACARD |
| PL-03 | SAFETY PLANS-1 |
| PL-04 | SAFETY PLANS-2 |
| SS | SPEC SHEET(S) |

## SCOPE OF WORK

GENERAL SYSTEM INFORMATION:
SYSTEM SIZE:
10800W DC, 10000W AC
MODULES:
(27)HANWHA QCELLS Q.PEAK DUO BLK ML-G10PLUS 400W
INVERTER:
(1)SOLAREDGE TECHNOLOGIES SE10000H-US(240V)
OPTIMIZER:
(27)SOLAREDGE P340 POWER OPTIMIZER

## GENERAL NOTES

1.MODULES ARE LISTED UNDER UL 1703 AND CONFORM TO THE STANDARDS.
2.INVERTERS ARE LISTED UNDER UL 1741 AND CONFORM TO THE STANDARDS.
3.DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT OF THE PV SYSTEM AND THE ACTUAL SITE CONDITION MIGHT VARY.
4.WORKING CLEARANCES AROUND THE NEW PV ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.
5.ALL GROUND WIRING CONNECTED TO THE MAIN SERVICE GROUNDING IN MAIN SERVICE PANEL/ SERVICE EQUIPMENT.
6.ALL CONDUCTORS SHALL BE 600V, 75°C STANDARD COPPER UNLESS OTHERWISE NOTED.
7.WHEN REQUIRED, A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
8.THE SYSTEM WILL NOT BE INTERCONNECTED BY THE CONTRACTOR UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND/OR THE UTILITY.
9.ROOF ACCESS POINT SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREES, WIRES OR SIGNS.
10.PV ARRAY COMBINER/JUNCTION BOX PROVIDES TRANSITION FROM ARRAY WIRING TO CONDUIT WIRING

## SITE PLAN LAYOUT

## APPLICABLE CODES

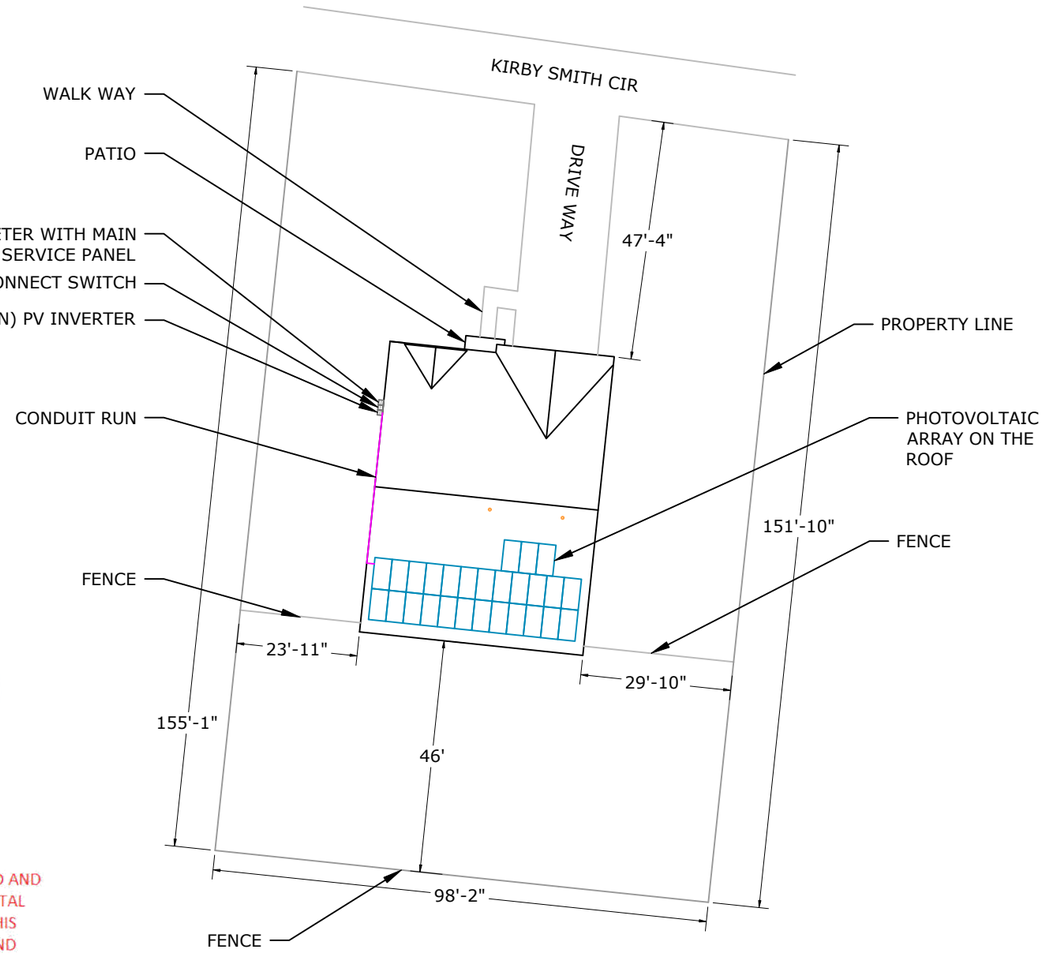
- NORTH CAROLINA ELECTRIC CODE:NCEC 2017
- NORTH CAROLINA FIRE CODE:NCFC 2018
- NORTH CAROLINA BUILDING CODE:NCBC 2018
- NORTH CAROLINA RESIDENTIAL CODE: NCRC 2018

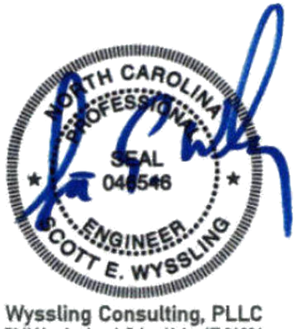
NOTE: NO GATE OR FENCE

**ENGINEERING SCOPE OF WORK**

1. ILLUMINE INDUSTRIES INC. HAS ONLY PROVIDED DRAFTING SERVICES FOR THE PERMIT DRAWINGS. NO ACTUAL ENGINEERING WORK, ENGINEERING REVIEW OR ENGINEERING.
APPROVAL HAS BEEN CONDUCTED BY ILLUMINE INDUSTRIES INC UNLESS NOTED OTHERWISE.
2. WHEN A PROFESSIONAL ENGINEER APPROVES AND SEALS THE DESIGN FOR COMPONENTS OF THEIR RESPECTIVE DISCIPLINE (STRUCTURAL/ELECTRICAL) SHOWN ON THESE PERMIT. DRAWINGS, HE/SHE:
a. TAKES FULL DIRECT CONTROL OF THE ENGINEERED DESIGN.
b. IS GIVEN ACCESS TO PERSONALLY SUPERVISE AND RECTIFY ANY ASPECT OF THE ENGINEERED DESIGN.
c. HAS FULLY ACCEPTED RESPONSIBILITY FOR THE ENGINEERED DESIGN.

D
03/14/2023

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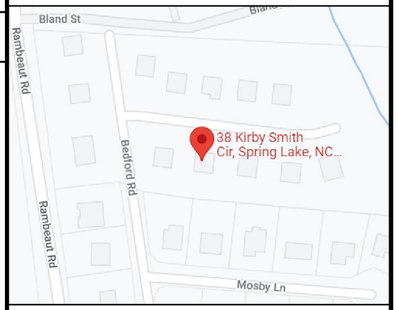
SCALE:1"=30'-0"

## VICINITY MAP





TITAN SOLAR POWER
**ADDRESS:** 525W, BASELINE RD
MESA AZ,85210
LICENSE#'S GC:84439 EC:U.34445


## CUSTOMER INFORMATION

NAME:NANCY RAMIREZ

ADDRESS:38 KIRBY SMITH CIR, SPRING LAKE, NC 28390

35.233667, -78.941037
APN: 010-513-000-464

TITAN'S PRN NO: TSP130202

AHJ:NC-COUNTY HARNETT

UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

COVER PAGE

| | |
|---|---|
| DRAFTED BY: K.UTKARSHA<br>QC'ED BY: A.N.KRISHNAN | PAPER SIZE:17"X11" |
| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | T-01 |

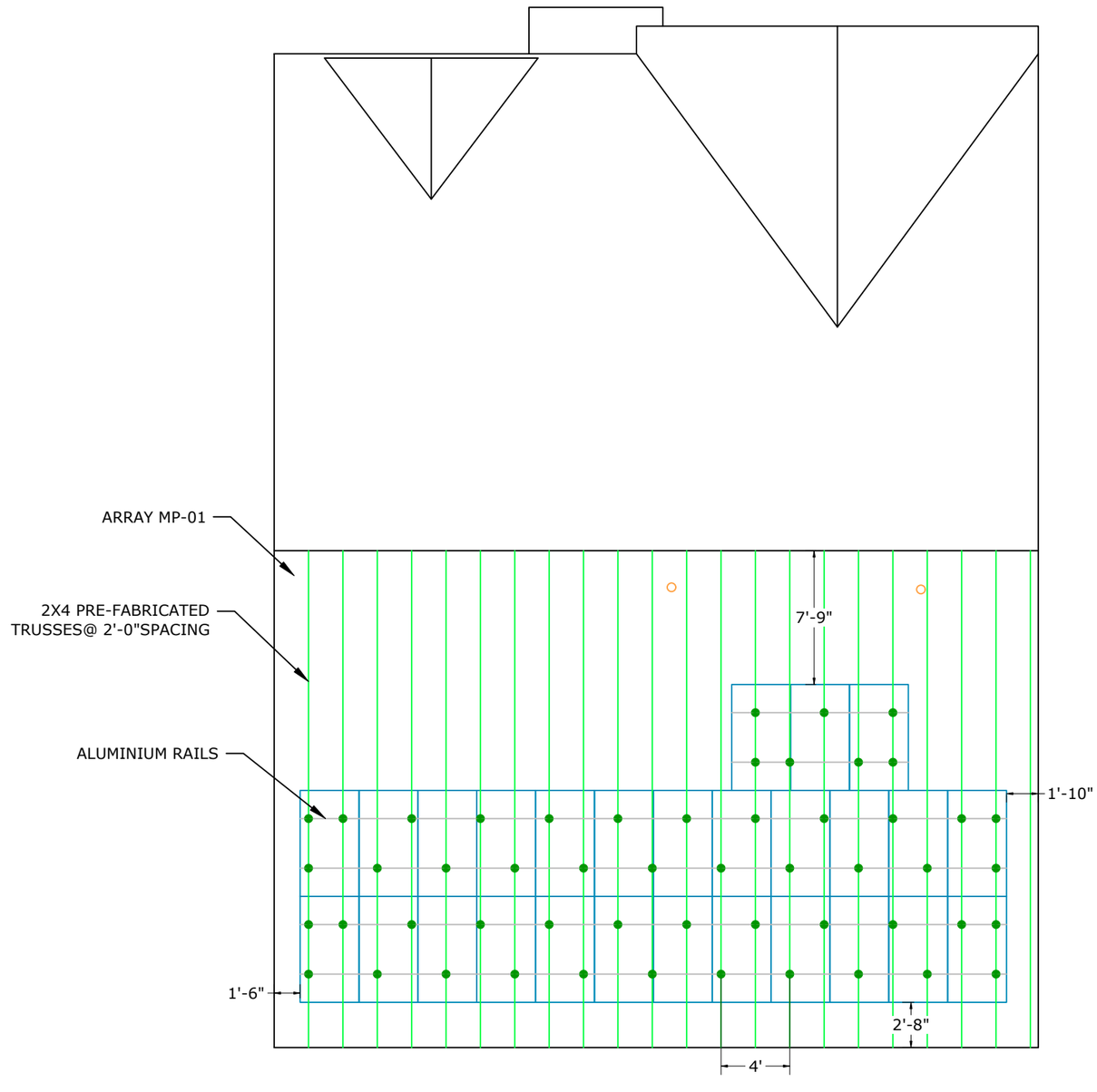
## INSTALLATION NOTES

1.STRUCTURAL ROOF MEMBER LOCATIONS ARE ESTIMATED AND SHOULD BE LOCATED AND VERIFIED BY THE CONTRACTOR WHEN LAG BOLT PENETRATION OR MECHANICAL ATTACHMENT TO THE STRUCTURE IS REQUIRED.
2.ROOFTOP PENETRATIONS FOR SOLAR RACKING WILL BE COMPLETED AND SEALED WITH APPROVED SEALANT PER CODE BY A LICENSED CONTRACTOR.
3.LAGS MUST HAVE A MINIMUM 2.5" THREAD EMBEDMENT INTO THE STRUCTURAL MEMBER.
4.ALL PV RACKING ATTACHMENTS SHALL BE STAGGERED BY ROW BETWEEN THE ROOF FRAMING MEMBERS AS NECESSARY.
5.ROOF MOUNTED STANDARD RAIL REQUIRES ONE THERMAL EXPANSION GAP FOR EVERY RUN OF RAIL GREATER THAN 40'.
6.ALL CONDUCTORS AND CONDUITS ON THE ROOF SHALL BE MINIMUM 2.5" ABOVE THE ROOF SURFACE (INCLUDING CABLES UNDERNEATH MODULES AND RACKING).
7.THE PV INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL OR BUILDING ROOF VENTS.

**SITE INFORMATION -** WIND SPEED: 119 MPH AND SNOW LOAD: 10 PSF

| SR. NO | AZIMUTH | PITCH | NO. OF MODULES | ARRAY AREA (SQ. FT.) | ROOF TYPE | ATTACHMENT | ROOF EXPOSURE | FRAME TYPE | FRAME SIZE | FRAME SPACING | MAX RAIL SPAN | OVER HANG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MP-01 | 188° | 27° | 27 | 570.3 | COMPOSITION SHINGLE | K2 SPLICE FOOT X | ATTIC | PRE-FABRICATED TRUSSES | 2 X 4 | 2'-0" | 4'-0" | 1'-6" |

NOTE:PENETRATIONS ARE STAGGERED





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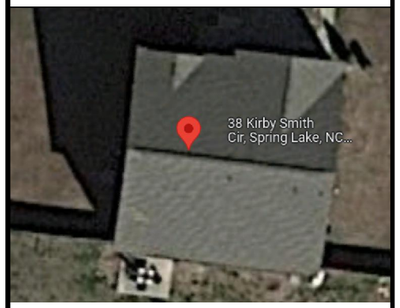
AERIAL VIEW

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ILLUMINE

MOUNTING DETAIL

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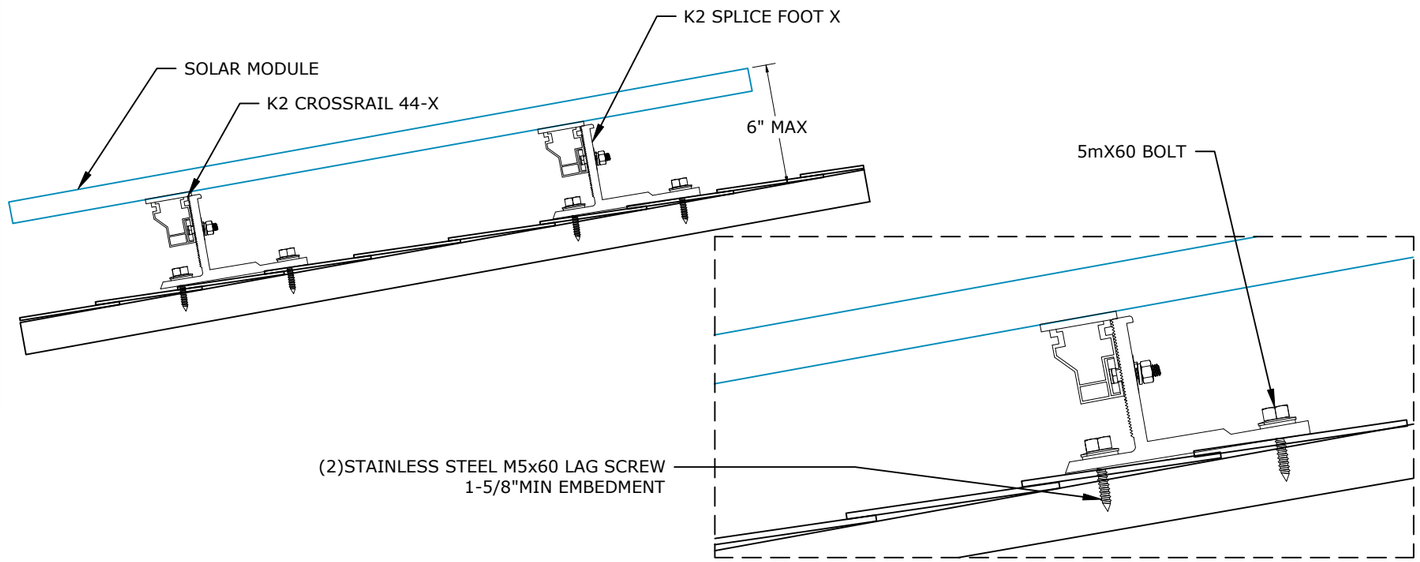
## DEAD LOAD CALCULATIONS

| BOM | QUANTITY | LBS/UNIT | TOTAL WEIGHT (LBS) |
|---|---|---|---|
| MODULES | 27 | 48.5 | 1309.50 |
| MID-CLAMP | 48 | 0.300 | 14.40 |
| END-CLAMP | 12 | 0.310 | 3.72 |
| RAIL LENGTH | 179 | 0.560 | 100.24 |
| SPLICE BAR | 8 | 0.650 | 5.20 |
| K2 SPLICE FOOT X | 53 | 1.45 | 76.85 |
| **TOTAL WEIGHT OF THE SYSTEM (LBS)** | | | 1509.91 |
| **TOTAL ARRAY AREA ON THE ROOF (SQ. FT.)** | | | 570.26 |
| **WEIGHT PER SQ. FT.(LBS)** | | | 2.65 |
| **WEIGHT PER PENETRATION (LBS)** | | | 28.488868 |

## ATTACHMENT DETAIL-K2 SPLICE FOOT X




SCALE:NTS

## MODULES DATA

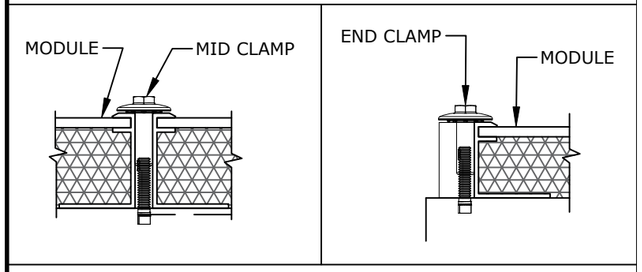
HANWHA QCELLS Q.PEAK DUO BLK ML-G10PLUS 400W

| | |
|---|---|
| MODULE DIMS | 74"x41.1"x1.26" |
| LAG SCREWS | M5X60:1-5/8"MIN EMBEDMENT |

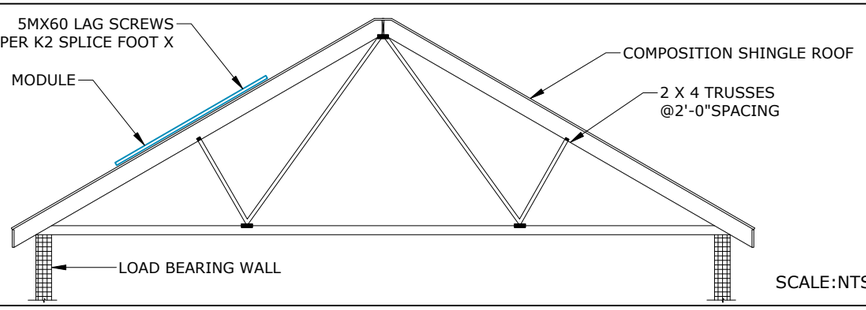
## UPLIFT CALCULATIONS

| | | |
|---|---|---|
| UPLIFT | 17107.9 | LBS |
| PULL OUT STRENGTH | 32595 | LBS |
| POINT LOADING | 25 | LBS |

## MID-CLAMP AND END-CLAMP ANATOMY




## ROOF FRAMING DETAILS

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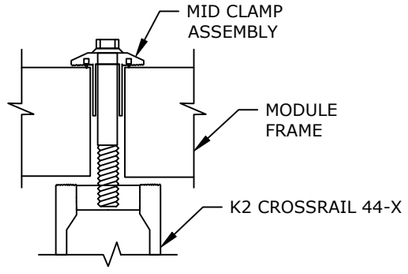
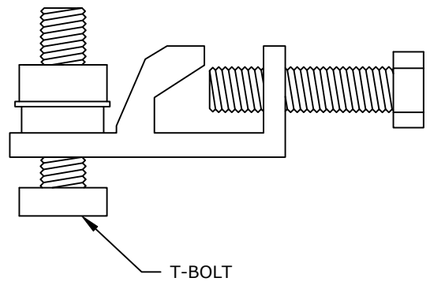
## GROUNDING DETAILS

### MODULE TO MODULE & MODULE TO RAIL

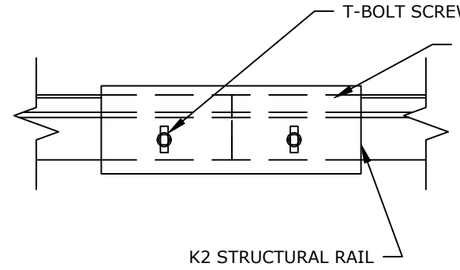



GROUNDING MID-CLAMP
SCALE: NTS

### GROUNDING LUG




### RAIL TO RAIL




SCALE: NTS

TITAN SOLAR POWER

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LICENSE#'S GC:84439 EC:U.34445

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UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

STRUCTURAL DETAIL

| | |
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| DRAFTED BY: K.UTKARSHA QC'ED BY: A.N.KRISHNAN | PAPER SIZE:17"X11" |
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| DATE:3/14/2023 | S-02 |

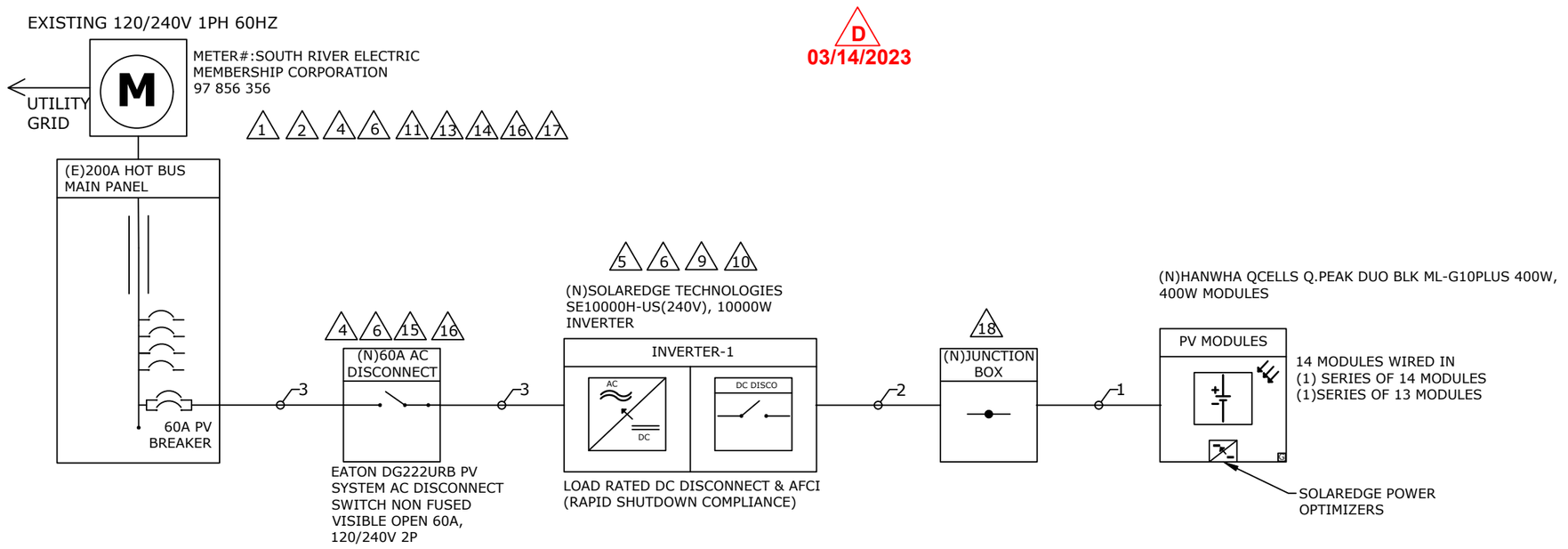
# SINGLE LINE DIAGRAM: DC SYSTEM SIZE - 10800W, AC SYSTEM SIZE - 10000W

| INVERTER-1 SPECIFICATIONS | |
|---|---|
| MODEL | SOLAREDGE TECHNOLOGIES SE10000H-US(240V) |
| POWER RATING | 10000W |
| MAX OUTPUT CURRENT | 42A |
| CEC WEIGHTED EFFICIENCY | 99% |
| MAX INPUT CURRENT | 27A |
| MAX DC VOLTAGE | 480V |

| MODULE SPECIFICATION | |
|---|---|
| MODEL | HANWHA QCELLS Q.PEAK DUO BLK ML-G10PLUS 400W |
| MODULE POWER @ STC | 400W |
| OPEN CIRCUIT VOLTAGE:**Voc** | 45.30V |
| MAX POWER VOLTAGE:**Vmp** | 37.13V |
| SHORT CIRCUIT CURRENT:**Isc** | 11.14A |
| MAX POWER CURRENT:**Imp** | 10.77A |

| OPTIMIZER CHARACTERISTICS | |
|---|---|
| MODEL | **P340** |
| MIN INPUT VOLTAGE | 8 VDC |
| MAX INPUT VOLTAGE | 48 VDC |
| MAX INPUT CURRENT | 11 ADC |
| MAX OUTPUT CURRENT | 15 ADC |

| SYSTEM CHARACTERISTICS | |
|---|---|
| DC SYSTEM SIZE | 10800 W |
| INVERTER STRING VOLTAGE:**Vmp** | 400V |
| MAX INVERTER SYSTEM VOLTAGE: **Voc** | 480V |
| MAX SHORT CIRCUIT CURRENT | 15A |
| OPERATING CURRENT | 14.00A |




| CONDUIT SCHEDULE | | | | |
|---|---|---|---|---|
| TAG ID | CONDUIT SIZE | CONDUCTOR | NEUTRAL | GROUND |
| 1 | NONE | (4) 10AWG PV WIRE | NONE | (1) 6AWG BARE COPPER |
| 2 | 3/4"EMT | (4) 10AWG THHN/THWN-2 | NONE | (1) 10AWG THHN/THWN-2 |
| 3 | 3/4"EMT | (2) 6AWG THHN/THWN-2 | (1) 6AWG THHN/THWN-2 | (1) 10AWG THHN/THWN-2 |

**NOTE:**
MAIN PANEL RATING:200A
ALLOWABLE BACKFEED IS =200A

**OCPD CALCULATIONS:**
INVERTER OVERCURRENT PROTECTION= INVERTER O/P I X CONTINUOUS LOAD(1.25)
=42x1.25=52.50A=>PV BREAKER = 60A
TOTAL REQUIRED PV BREAKER SIZE =>60A PV BREAKER

## ELECTRICAL CALCULATIONS

**DC WIRE SIZING CALCULATIONS BASED ON THE FOLLOWING EQUATIONS>>**
- REQUIRED CONDUCTOR AMPACITY: 125% X Isc(A) X #OF PARALLEL STRINGS = MAX CURRENT PER 690.8(A)(1) X 125% = MAX CURRENT PER 690.8(B)(1)
- CORRECTED AMPACITY CALCULATIIONS: AMAPCITY X TEMPERATURE DERATE FACTOR X COUDUIT FILL DERATE = DERATED CONDUCTOR AMPACITY PER 690.8(B)(2)
- DERATE CONDUCTOR AMPACITY CHECK: MAX CURRENT PER 690.8(A)(1) < DERATED CONDUCTOR AMPACITY

**AC WIRE SIZING CALCULATIONS BASED ON THE FOLLOWING EQUATIONS>>**
- REQUIRED CONDUCTOR AMPACITY: INVERTER OUTPUT CURRENT X #OF INVERTERS = MAX CURRENT PER 690.8(A)(3) X 125% = MAX CURRENT PER 690.8(B)(1)
- CORRECTED AMPACITY CALCULATIONS: AMPACITY X TEMPERATURE DERATE FACTOR X CONDUIT FILL DERATE = DERATED CONDUCTOR AMPACITY PER 690.8(B)(2)
- DERATED CONDUCTOR AMPACITY CHECK: MAX CURRENT PER 690.8(A)(3) < DERATED CONDUCTOR AMPACITY

DC WIRE CALCULATIONS:- MATERIAL:COPPER & TEMPERATURE RATING:90°C

| TAG ID | REQUIRED CONDUCTOR AMPACITY | | | | | | | | | | | CORRECTED AMPACITY CALCULATION | | | | | | | DERATED CONDUCTOR AMPACITY CHECK | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | X | 15 | X | 1 | = | 15 | X | 1.25 | = | 18.75A | 40 | X | 0.71 | X | 0.8 | = | 22.72A | 18.75A | < | 22.72A |
| 2 | 1 | X | 15 | X | 1 | = | 15 | X | 1.25 | = | 18.75A | 40 | X | 0.71 | X | 0.8 | = | 22.72A | 18.75A | < | 22.72A |

AC WIRE CALCULATIONS:- MATERIAL:COPPER & TEMPERATURE RATING:90°C

| TAG ID | REQUIRED CONDUCTOR AMPACITY | | | | | | | | | CORRECTED AMPACITY CALCULATION | | | | | | | DERATED CONDUCTOR AMPACITY CHECK | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 42 | X | 1 | = | 42.00 | X | 1.25 | = | 52.50A | 75 | X | 0.87 | X | 1 | = | 65.25A | 52.50A | < | 65.25A |

## ELECTRICAL NOTES

1. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 310.10(D).
2. CONDUCTORS EXOPSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.10(C).
3. MAXIMUM DC/AC VOLTAGE DROP SHALL BE NO MORE THAN 2%.
4. ALL CONDUCTORS SHALL BE IN CONDUIT UNLESS OTHERWISE NOTED.
5. BREAKER/FUSE SIZES PER NEC 240.
6. AC EQUIPMENT GROUNDING CONDUCTOR SIZED PER NEC 250.122.
7. AMBIENT TEMPERATURE CORRECTION FACTOR IS BASED ON NEC 690.31(A).
8. AMBIENT TEMPERATURE ADJUSTMENT FACTOR IS BASED ON NEC 310.15(B)(2).
9. MAX SYSTEM VOLTAGE CORRRECTION IS PER NEC 690.7.
10. CONDUCTORS ARE SIZED PER NEC TABLE 310.15(B)(16).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ILLUMINE

SINGLE LINE DIAGRAM

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| DATE:3/14/2023 | E-01 |

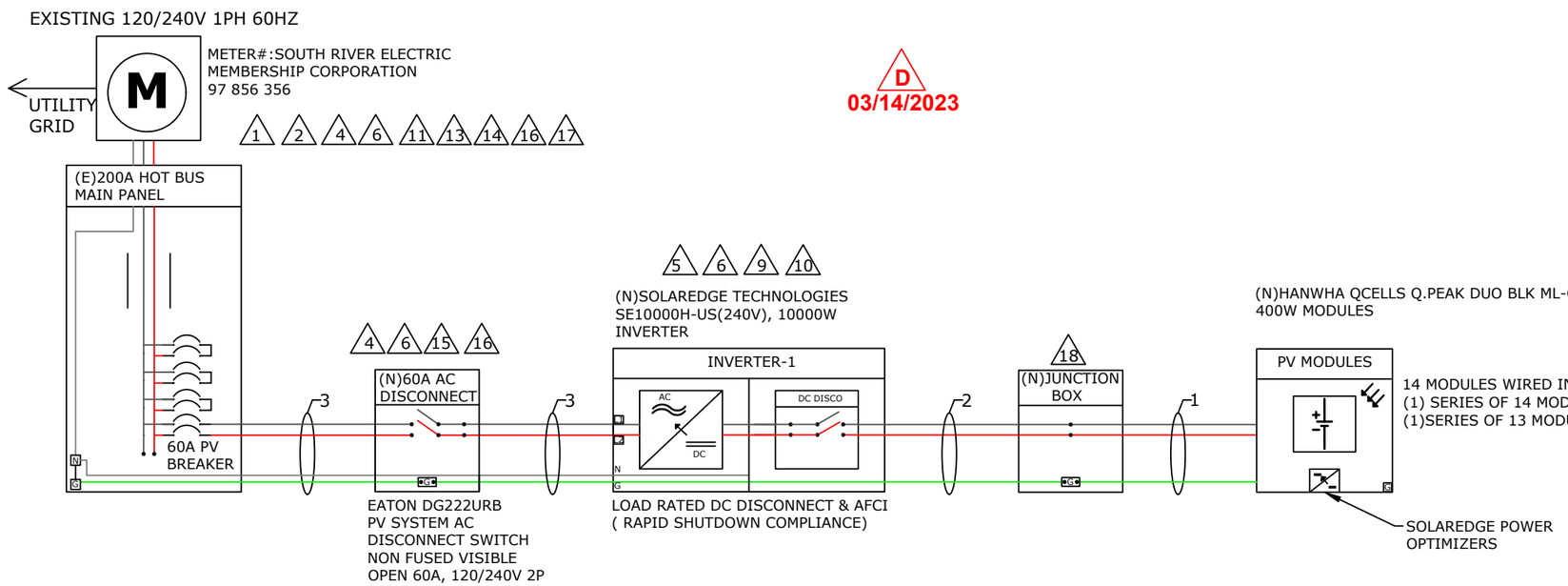
# THREE LINE DIAGRAM: DC SYSTEM SIZE - 10800W, AC SYSTEM SIZE - 10000W

| INVERTER-1 SPECIFICATIONS | |
|---|---|
| MODEL | SOLAREDGE TECHNOLOGIES SE10000H-US(240V) |
| POWER RATING | 10000W |
| MAX OUTPUT CURRENT | 42A |
| CEC WEIGHTED EFFICIENCY | 99% |
| MAX INPUT CURRENT | 27A |
| MAX DC VOLTAGE | 480V |

| MODULE SPECIFICATION | |
|---|---|
| MODEL | HANWHA QCELLS Q.PEAK DUO BLK ML-G10PLUS 400W |
| MODULE POWER @ STC | 400W |
| OPEN CIRCUIT VOLTAGE:**Voc** | 45.30V |
| MAX POWER VOLTAGE:**Vmp** | 37.13V |
| SHORT CIRCUIT CURRENT:**Isc** | 11.14A |
| MAX POWER CURRENT:**Imp** | 10.77A |

| OPTIMIZER CHARACTERISTICS | |
|---|---|
| MODEL | **P340** |
| MIN INPUT VOLTAGE | 8 VDC |
| MAX INPUT VOLTAGE | 48 VDC |
| MAX INPUT CURRENT | 11 ADC |
| MAX OUTPUT CURRENT | 15 ADC |

| SYSTEM CHARACTERISTICS | |
|---|---|
| DC SYSTEM SIZE | 10800 W |
| INVERTER STRING VOLTAGE:**Vmp** | 400V |
| MAX INVERTER SYSTEM VOLTAGE: **Voc** | 480V |
| MAX SHORT CIRCUIT CURRENT | 15A |
| OPERATING CURRENT | 14.00A |




| CONDUIT SCHEDULE | | | | |
|---|---|---|---|---|
| TAG ID | CONDUIT SIZE | CONDUCTOR | NEUTRAL | GROUND |
| 1 | NONE | (4) 10AWG PV WIRE | NONE | (1) 6AWG BARE COPPER |
| 2 | 3/4"EMT | (4) 10AWG THHN/THWN-2 | NONE | (1) 10AWG THHN/THWN-2 |
| 3 | 3/4"EMT | (2) 6AWG THHN/THWN-2 | (1) 6AWG THHN/THWN-2 | (1) 10AWG THHN/THWN-2 |

**NOTE:**
MAIN PANEL RATING:200A
ALLOWABLE BACKFEED IS =200A

**OCPD CALCULATIONS:**
INVERTER OVERCURRENT PROTECTION= INVERTER O/P I X CONTINUOUS LOAD(1.25)
=42x1.25=52.50A=>PV BREAKER = 60A
TOTAL REQUIRED PV BREAKER SIZE =>60A PV BREAKER

## ELECTRICAL CALCULATIONS

**DC WIRE SIZING CALCULATIONS BASED ON THE FOLLOWING EQUATIONS>>**
- REQUIRED CONDUCTOR AMPACITY: 125% X Isc(A) X #OF PARALLEL STRINGS = MAX CURRENT PER 690.8(A)(1) X 125% = MAX CURRENT PER 690.8(B)(1)
- CORRECTED AMPACITY CALCULATIIONS: AMAPCITY X TEMPERATURE DERATE FACTOR X COUDUIT FILL DERATE = DERATED CONDUCTOR AMPACITY PER 690.8(B)(2)
- DERATE CONDUCTOR AMPACITY CHECK: MAX CURRENT PER 690.8(A)(1) < DERATED CONDUCTOR AMPACITY

**AC WIRE SIZING CALCULATIONS BASED ON THE FOLLOWING EQUATIONS>>**
- REQUIRED CONDUCTOR AMPACITY: INVERTER OUTPUT CURRENT X #OF INVERTERS = MAX CURRENT PER 690.8(A)(3) X 125% = MAX CURRENT PER 690.8(B)(1)
- CORRECTED AMPACITY CALCULATIONS: AMPACITY X TEMPERATURE DERATE FACTOR X CONDUIT FILL DERATE = DERATED CONDUCTOR AMPACITY PER 690.8(B)(2)
- DERATED CONDUCTOR AMPACITY CHECK: MAX CURRENT PER 690.8(A)(3) < DERATED CONDUCTOR AMPACITY

DC WIRE CALCULATIONS:- MATERIAL:COPPER & TEMPERATURE RATING:90°C

| TAG ID | REQUIRED CONDUCTOR AMPACITY | | | | | | | | | | | CORRECTED AMPACITY CALCULATION | | | | | | | DERATED CONDUCTOR AMPACITY CHECK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | X | 15 | X | 1 | = | 15 | X | 1.25 | = | 18.75A | 40 | X | 0.71 | X | 0.8 | = | 22.72A | 18.75A | < | 22.72A |
| 2 | 1 | X | 15 | X | 1 | = | 15 | X | 1.25 | = | 18.75A | 40 | X | 0.71 | X | 0.8 | = | 22.72A | 18.75A | < | 22.72A |

AC WIRE CALCULATIONS:- MATERIAL:COPPER & TEMPERATURE RATING:90°C

| TAG ID | REQUIRED CONDUCTOR AMPACITY | | | | | | | | | CORRECTED AMPACITY CALCULATION | | | | | | | DERATED CONDUCTOR AMPACITY CHECK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 42 | X | 1 | = | 42.00 | X | 1.25 | = | 52.50A | 75 | X | 0.87 | X | 1 | = | 65.25A | 52.50A | < | 65.25A |

## ELECTRICAL NOTES

1. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 310.10(D).
2. CONDUCTORS EXOPSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.10(C).
3. MAXIMUM DC/AC VOLTAGE DROP SHALL BE NO MORE THAN 2%.
4. ALL CONDUCTORS SHALL BE IN CONDUIT UNLESS OTHERWISE NOTED.
5. BREAKER/FUSE SIZES PER NEC 240.
6. AC EQUIPMENT GROUNDING CONDUCTOR SIZED PER NEC 250.122.
7. AMBIENT TEMPERATURE CORRECTION FACTOR IS BASED ON NEC 690.31(A).
8. AMBIENT TEMPERATURE ADJUSTMENT FACTOR IS BASED ON NEC 310.15(B)(2).
9. MAX SYSTEM VOLTAGE CORRRECTION IS PER NEC 690.7.
10. CONDUCTORS ARE SIZED PER NEC TABLE 310.15(B)(16).


TITAN SOLAR POWER
**ADDRESS:** 525W, BASELINE RD MESA AZ,85210
LICENSE#'S GC:84439 EC:U.34445


## CUSTOMER INFORMATION

NAME:NANCY RAMIREZ

ADDRESS:38 KIRBY SMITH CIR, SPRING LAKE, NC 28390

35.233667, -78.941037
APN: 010-513-000-464

TITAN'S PRN NO: TSP130202

AHJ:NC-COUNTY HARNETT

UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

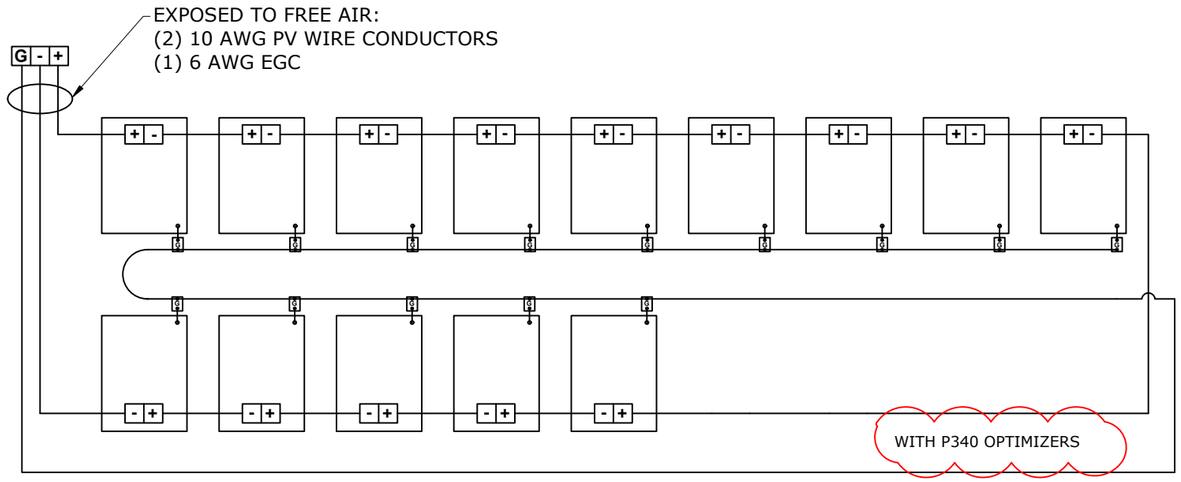
ILLUMINE

THREE LINE DIAGRAM

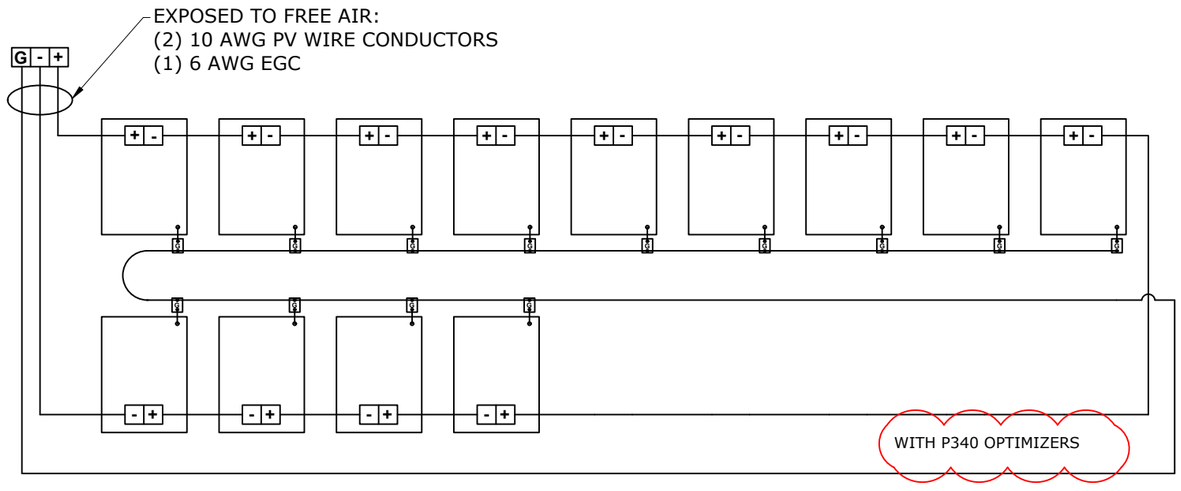
| | |
|---|---|
| DRAFTED BY: K.UTKARSHA QC'ED BY: A.N.KRISHNAN | PAPER SIZE:17"X11" |
| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | E-02 |

# STRING WIRING DIAGRAM

## 1 STRING OF 14 MODULES




## 1 STRING OF 13 MODULES

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03/14/2023

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ILLUMINE

STRING WIRING DIAGRAM

| | |
|---|---|
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| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | E-03 |

# WARNING PLACARDS

1

**⚠ CAUTION**

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

LABEL LOCATION
BACKFED BREAKER [PER CODE: NEC 705.12(4)]

2

**⚠ WARNING**

INVERTER OUTPUT CONNECTION:
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION: BACKFED BREAKER
[PER CODE: 2017 NEC 705.12(B)(2)(3)(b)]

3

**WARNING**

A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE MAIN SERVICE DISCONNECT. FOLLOW THE PROPER LOCK-OUT/TAG-OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE

LABEL LOCATION: (IF APPLICABLE) SUPPLY SIDE TAP LOAD PANEL
[PER CODE: UTILITY]

4

**PHOTOVOLTAIC AC DISCONNECT**

RATED AC OPERATING CURRENT 42.00 A
AC NOMINAL OPERATING VOLTAGE 240 VAC

LABEL LOCATION: MAIN SERVICE DISCONNECT,
AC DISCONNECT(S) & SERVICE PANEL
[PER CODE: NEC 690.13(B)]

5

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

LABEL LOCATION: INVERTER
[PER CODE: NEC 690.56(C)(3)]

6

**⚠ WARNING**

**ELECTRIC SHOCK HAZARD**

TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION: MAIN SERVICE DISCONNECT
AC DISCONNECT,SERVICE PANEL,
AC COMBINER & INVERTER(S)
[PER CODE: NEC 690.13(B)]

8

**⚠ WARNING**

PHOTOVOLTAIC SYSTEM
COMBINER PANEL

DO NOT ADD LOADS

LABEL LOCATION: AC COMBINER PANEL
[PER CODE: NEC 690.13(B)]

9

**MAXIMUM VOLTAGE: 480 VDC**
**MAXIMUM CIRCUIT CURRENT: 15 ADC**
**MAX. RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC-CONVERTER (IF INSTALLED) 15 ADC**

LABEL LOCATION: INVERTER
[PER CODE: NEC 690.53 ]

10

**⚠ WARNING**

**ELECTRIC SHOCK HAZARD**

TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

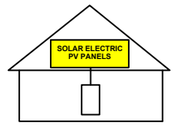
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION
DC DISCONNECT INVERTER, COMBINE BOX
[PER CODE: NEC 690.13(B)]

11

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY




LABEL LOCATION: MAIN SERVICE DISCONNECT
[PER CODE:NEC 690.56(C)(1)(a)]

13

**⚠ CAUTION**

DUAL POWER SOURCE
SECOND SOURCE IS
PHOTOVOLTAIC

LABEL LOCATION :MAIN SERVICE DISCONNECT
AC DISCONNECT,SERVICE PANEL,
REVENUE METER & AC COMBINER
[PER CODE: NEC705.12(B)(3)]

14

**⚠ WARNING**

**INVERTER OUTPUT CONNECTION**

**DO NOT RELOCATE THIS OVER-CURRENT DEVICE**

LABEL LOCATION :(IF APPLICABLE) SERVICE PANEL
[PER CODE: NEC 705.12(D)(7)]

15

**PHOTOVOLTAIC SYSTEM
UTLITY DISCONNECT SWITCH**

LABEL LOCATION :AC DISCONNECT
[PER CODE:NEC 690.56(C)(3)]

16

**⚠ WARNING**

**ELECTRIC SHOCK HAZARD**

IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION
AC DISCONNECT COMBINER BOX SERVICE METER
[PER CODE: NEC 690.5(C)]

17

**PV SOLAR BREAKER**

DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION
MAIN SERVICE DISCONNECT & SERVICE PANEL
[PER CODE:NEC 705.12(B)(2)(3)(b)]

18

**WARNING PHOTOVOLTAIC POWER SOURCE**

LABEL LOCATION
DC CONDUIT NO MORE THAN 10FT
[PER CODE: NEC 690.31(G)(3)]

REFLECTIVE AND WEATHER RESISTANCE LABEL REQUIRES CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8INCH, WHITE LETTERS ON RED BACKGROUND LABELS SHALL BE PLACED ON INTERIOR AND EXTERIOR DCCONDUIT, RACEWAYS, ENCLOSURE, AND CABLE ASSEMBLIES EVERY 10 FEET, WITHIN 1 FOOT OF TURNS OR BENDSAND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/ CEILING ASSEMBLIES, WALLS OR BARRIERS.

TITAN SOLAR POWER

**ADDRESS:** 525W, BASELINE RD
MESA AZ,85210
LICENSE#'S GC:84439 EC:U.34445

## CUSTOMER INFORMATION

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AHJ:NC-COUNTY HARNETT

UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

WARNING PLACARDS

| | |
|---|---|
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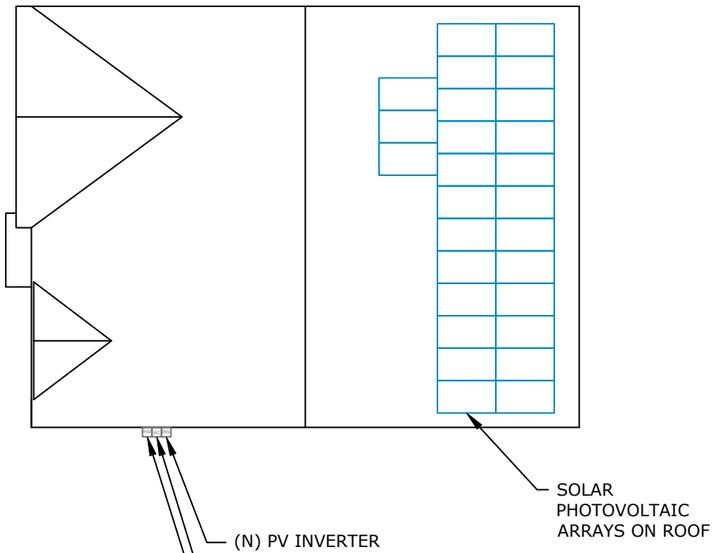
| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | PL-01 |

# DIRECTORY PLACARD

**CAUTION: MULTIPLE SOURCES OF POWER**

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN




**38 KIRBY SMITH CIR, SPRING LAKE, NC 28390**

LABEL LOCATION
SERVICE PANEL
PER CODE: NEC 705.10
ALL PLACARDS SHALL BE OF WEATHER PROOF CONSTRUCTION, BACKGROUND ON ALL PLACARDS SHALL BE RED WITH WHITE LETTERING U.O.N.
PLACARD SHALL BE MOUNTED DIRECTLY ON THE EXISTING UTILITY ELECTRICAL SERVICE.
FASTENERS APPROVED BY THE LOCAL JURISDICTION


TITAN SOLAR POWER
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UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

DIRECTORY PLACARD

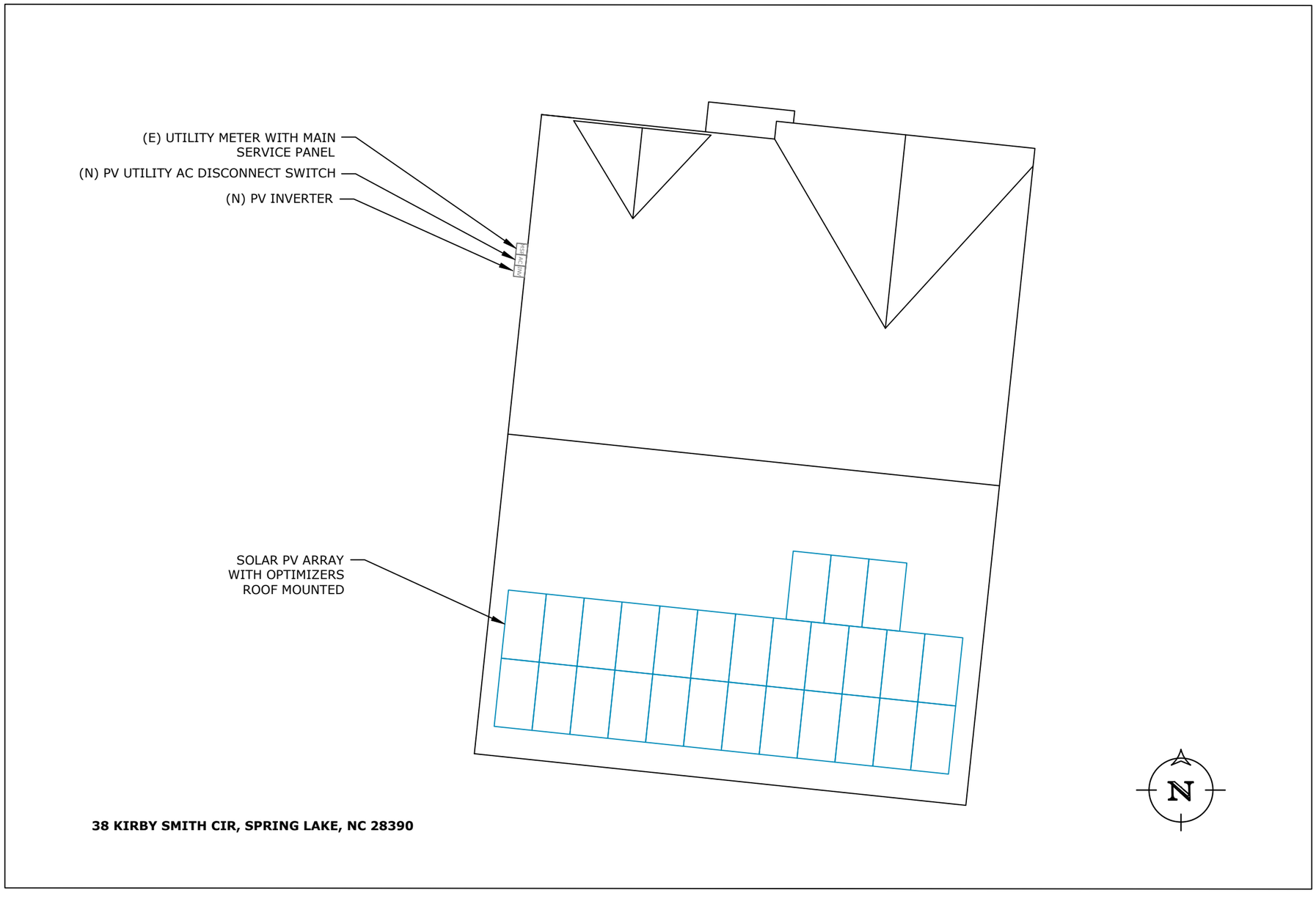
| | |
|---|---|
| DRAFTED BY: K.UTKARSHA<br>QC'ED BY: A.N.KRISHNAN | PAPER SIZE:17"X11" |
| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | PL-02 |

## SAFETY PLANS

NOTES:
1. INSTALLERS SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME.
2. INSTALLERS SHALL UPDATE NAME ADDRESS AND PHONE NUMBER OF NEAREST.
3. URGENT CARE FACILITY RELATIVE TO THE SITE BEFORE STARTING WORK.

LOCATION OF NEAREST URGENT CARE FACILITY

NAME:
ADDRESS:
PHONE NUMBER:




**38 KIRBY SMITH CIR, SPRING LAKE, NC 28390**

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UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

SAFETY PLANS-1

| | |
|---|---|
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| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | PL-03 |

## SAFETY PLANS

NOTES:
1. INSTALLERS SHALL DRAW IN DESIGNATED SAFETY AREA AROUND HOME.
2. INSTALLERS SHALL UPDATE NAME ADDRESS AND PHONE NUMBER OF NEAREST.
3. URGENT CARE FACILITY RELATIVE TO THE SITE BEFORE STARTING WORK.

LOCATION OF NEAREST URGENT CARE FACILITY

NAME:
ADDRESS:
PHONE NUMBER:

**PERSONS COVERED BY THIS JOB SAFETY PLAN**

**INJURED AT WORK TODAY?**
**INITIAL YES OR NO**

| PRINT NAME | INITIAL | YES | NO |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

UNDERGROUND DIG REQUIRED?

YES _____ PERMIT #_____

TITAN SOLAR POWER
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AHJ:NC-COUNTY HARNETT

UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

SAFETY PLANS-2

| | |
|---|---|
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| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | PL-04 |

# SPEC SHEET

powered by Q.ANTUM DUO Z

# Q.PEAK DUO BLK ML-G10+

## 385-405

ENDURING HIGH PERFORMANCE

25 YR Warranty Product & Performance

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2021

Q CELLS Yield Security

### BREAKING THE 20 % EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9 %.

### THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

### INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behavior.

### ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

### EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).

### A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty[2].

[1] APT test conditions according to IEC / TS 62804-1:2015, method A (–1500 V, 96 h)

[2] See data sheet on rear for further information.

### THE IDEAL SOLUTION FOR:

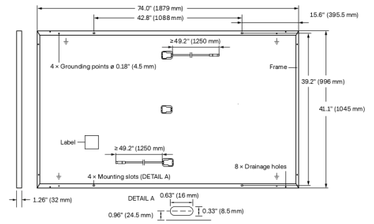
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

## MECHANICAL SPECIFICATION

| | |
|---|---|
| Format | 74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm) |
| Weight | 48.5 lbs (22.0 kg) |
| Front Cover | 0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology |
| Back Cover | Composite film |
| Frame | Black anodized aluminum |
| Cell | 6 × 22 monocrystalline Q.ANTUM solar half cells |
| Junction Box | 2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes |
| Cable | 4 mm² Solar cable; (+) ≥ 49.2 in (1250 mm), (–) ≥ 49.2 in (1250 mm) |
| Connector | Stäubli MC4; IP68 |

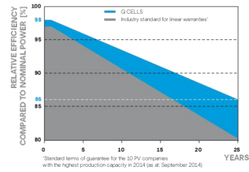



## ELECTRICAL CHARACTERISTICS

| POWER CLASS | | | | 385 | 390 | 395 | 400 | 405 |
|---|---|---|---|---|---|---|---|---|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W) | | | | | | | | |
| Minimum | Power at MPP[1] | $P_{MPP}$ | [W] | 385 | 390 | 395 | 400 | 405 |
| | Short Circuit Current[1] | $I_{SC}$ | [A] | 11.04 | 11.07 | 11.10 | 11.14 | 11.17 |
| | Open Circuit Voltage[1] | $V_{OC}$ | [V] | 45.19 | 45.23 | 45.27 | 45.30 | 45.34 |
| | Current at MPP | $I_{MPP}$ | [A] | 10.59 | 10.65 | 10.71 | 10.77 | 10.83 |
| | Voltage at MPP | $V_{MPP}$ | [V] | 36.36 | 36.62 | 36.88 | 37.13 | 37.39 |
| | Efficiency[1] | η | [%] | ≥19.6 | ≥19.9 | ≥20.1 | ≥20.4 | ≥20.6 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2] | | | | | | | | |
| Minimum | Power at MPP | $P_{MPP}$ | [W] | 288.8 | 292.6 | 296.3 | 300.1 | 303.8 |
| | Short Circuit Current | $I_{SC}$ | [A] | 8.90 | 8.92 | 8.95 | 8.97 | 9.00 |
| | Open Circuit Voltage | $V_{OC}$ | [V] | 42.62 | 42.65 | 42.69 | 42.72 | 42.76 |
| | Current at MPP | $I_{MPP}$ | [A] | 8.35 | 8.41 | 8.46 | 8.51 | 8.57 |
| | Voltage at MPP | $V_{MPP}$ | [V] | 34.59 | 34.81 | 35.03 | 35.25 | 35.46 |

[1] Measurement tolerances $P_{MPP}$ ±3 %; $I_{SC}$; $V_{OC}$ ±5 % at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

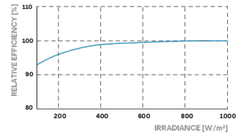
### Q CELLS PERFORMANCE WARRANTY




At least 98 % of nominal power during first year. Thereafter max. 0.5 % degradation per year. At least 93.5 % of nominal power up to 10 years. At least 86 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

### PERFORMANCE AT LOW IRRADIANCE




Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

### TEMPERATURE COEFFICIENTS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Temperature Coefficient of $I_{SC}$ | α | [%/K] | +0.04 | Temperature Coefficient of $V_{OC}$ | β | [%/K] | –0.27 |
| Temperature Coefficient of $P_{MPP}$ | γ | [%/K] | –0.34 | Nominal Module Operating Temperature | NMOT | [°F] | 109 ± 5.4 (43 ± 3 °C) |

## PROPERTIES FOR SYSTEM DESIGN

| | | | |
|---|---|---|---|
| Maximum System Voltage $V_{SYS}$ | [V] | 1000 (IEC) / 1000 (UL) | PV module classification | Class II |
| Maximum Series Fuse Rating | [A DC] | 20 | Fire Rating based on ANSI / UL 61730 | TYPE 2 |
| Max. Design Load, Push / Pull[3] | [lbs/ft²] | 75 (3600 Pa) / 55 (2660 Pa) | Permitted Module Temperature on Continuous Duty | –40 °F up to +185 °F (–40 °C up to +85 °C) |
| Max. Test Load, Push / Pull[3] | [lbs/ft²] | 113 (5400 Pa) / 84 (4000 Pa) | | |

[3] See Installation Manual

### QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells), QCPV Certification ongoing.

### PACKAGING INFORMATION

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Horizontal packaging | 76.4 in 1940 mm | 43.3 in 1100 mm | 48.0 in 1220 mm | 1656 lbs 751 kg | 24 pallets | 24 pallets | 32 modules |

**Note:** Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.


**Hanwha Q CELLS America Inc.**
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748 59 96 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.us




TITAN SOLAR POWER

**ADDRESS:** 525W, BASELINE RD MESA AZ,85210
LICENSE#'S GC:84439 EC:U.34445

## CUSTOMER INFORMATION

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ADDRESS:38 KIRBY SMITH CIR, SPRING LAKE, NC 28390

35.233667, -78.941037
APN: 010-513-000-464

TITAN'S PRN NO: TSP130202

AHJ:NC-COUNTY HARNETT

UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

MODULE SPEC SHEET

| | |
|---|---|
| DRAFTED BY: K.UTKARSHA<br>QC'ED BY: A.N.KRISHNAN | PAPER SIZE:17"X11" |
| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | SS-01 |

# Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS

12-25 YEAR WARRANTY


## Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

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## Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

| MODEL NUMBER | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|---|---|---|---|---|---|---|---|---|
| APPLICABLE TO INVERTERS WITH PART NUMBER | SEXXXXH-XXXXXBXX4 | | | | | | | |
| **OUTPUT** | | | | | | | | |
| Rated AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | VA |
| Maximum AC Power Output | 3000 | 3800 @ 240V<br>3300 @ 208V | 5000 | 6000 @ 240V<br>5000 @ 208V | 7600 | 10000 | 11400 @ 240V<br>10000 @ 208V | VA |
| AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Vac |
| AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229) | - | ✓ | - | ✓ | - | - | ✓ | Vac |
| AC Frequency (Nominal) | 59.3 - 60 - 60.5[1] | | | | | | | Hz |
| Maximum Continuous Output Current @240V | 12.5 | 16 | 21 | 25 | 32 | 42 | 47.5 | A |
| Maximum Continuous Output Current @208V | - | 16 | - | 24 | - | - | 48.5 | A |
| Power Factor | 1, Adjustable - 0.85 to 0.85 | | | | | | | |
| GFDI Threshold | 1 | | | | | | | A |
| Utility Monitoring, Islanding Protection, Country Configurable Thresholds | Yes | | | | | | | |
| **INPUT** | | | | | | | | |
| Maximum DC Power @240V | 4650 | 5900 | 7750 | 9300 | 11800 | 15500 | 17650 | W |
| Maximum DC Power @208V | - | 5100 | - | 7750 | - | - | 15500 | W |
| Transformer-less, Ungrounded | Yes | | | | | | | |
| Maximum Input Voltage | 480 | | | | | | | Vdc |
| Nominal DC Input Voltage | 380 | | | | 400 | | | Vdc |
| Maximum Input Current @240V[2] | 8.5 | 10.5 | 13.5 | 16.5 | 20 | 27 | 30.5 | Adc |
| Maximum Input Current @208V[2] | - | 9 | - | 13.5 | - | - | 27 | Adc |
| Max. Input Short Circuit Current | 45 | | | | | | | Adc |
| Reverse-Polarity Protection | Yes | | | | | | | |
| Ground-Fault Isolation Detection | 600kΩ Sensitivity | | | | | | | |
| Maximum Inverter Efficiency | 99 | 99.2 | | | | | | % |
| CEC Weighted Efficiency | 99 | | | | | | 99 @ 240V<br>98.5 @ 208V | % |
| Nighttime Power Consumption | < 2.5 | | | | | | | W |

[1] For other regional settings please contact SolarEdge support
[2] A higher current source may be used; the inverter will limit its input current to the values stated

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UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

INVERTER SPECSHEET

| | |
|---|---|
| DRAFTED BY:<br>K.UTKARSHA<br>QC'ED BY:<br>A.N.KRISHNAN | PAPER SIZE:17"X11" |
| SCALE:AS NOTED | REV:D |
| DATE:3/14/2023 | SS-02 |

# SPEC SHEET

# Single Phase Inverter with HD-Wave Technology for North America

## SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/ SE7600H-US / SE10000H-US / SE11400H-US

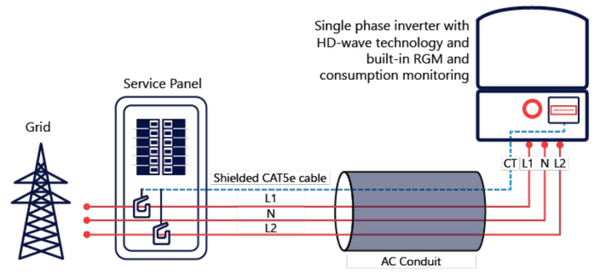
| MODEL NUMBER | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|---|---|---|---|---|---|---|---|---|
| **ADDITIONAL FEATURES** | | | | | | | | |
| Supported Communication Interfaces | RS485, Ethernet, ZigBee (optional), Cellular (optional) | | | | | | | |
| Revenue Grade Metering, ANSI C12.20 | Optional[3] | | | | | | | |
| Consumption metering | Optional[3] | | | | | | | |
| Inverter Commissioning | With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection | | | | | | | |
| Rapid Shutdown - NEC 2014 and 2017 690.12 | Automatic Rapid Shutdown upon AC Grid Disconnect | | | | | | | |
| **STANDARD COMPLIANCE** | | | | | | | | |
| Safety | UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07 | | | | | | | |
| Grid Connection Standards | IEEE1547, Rule 21, Rule 14 (HI) | | | | | | | |
| Emissions | FCC Part 15 Class B | | | | | | | |
| **INSTALLATION SPECIFICATIONS** | | | | | | | | |
| AC Output Conduit Size / AWG Range | 1" Maximum / 14-6 AWG | | | | | 1" Maximum /14-4 AWG | | |
| DC Input Conduit Size / # of Strings / AWG Range | 1" Maximum / 1-2 strings / 14-6 AWG | | | | | 1" Maximum / 1-3 strings / 14-6 AWG | | |
| Dimensions with Safety Switch (HxWxD) | 17.7 x 14.6 x 6.8 / 450 x 370 x 174 | | | | | 21.3 x 14.6 x 7.3 / 540 x 370 x 185 | | in / mm |
| Weight with Safety Switch | 22 / 10 | | 25.1 / 11.4 | | 26.2 / 11.9 | | 38.8 / 17.6 | lb / kg |
| Noise | < 25 | | | | | < 50 | | dBA |
| Cooling | Natural Convection | | | | | | | |
| Operating Temperature Range | -40 to +140 / -40 to +60[4] | | | | | | | °F / °C |
| Protection Rating | NEMA 4X (Inverter with Safety Switch) | | | | | | | |

[3] Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BNI4 . For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box

[4] Full power up to at least 50°C / 122°F, for power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

## How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills






RoHS

TITAN SOLAR POWER

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ILLUMINE

INVERTER SPECSHEET

| | |
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SPEC SHEET

# Power Optimizer

## For North America

P320 / P340 / P370 / P400 / P405 / P505


POWER OPTIMIZER

## PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

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# Power Optimizer

## For North America

P320 / P340 / P370 / P400 / P405 / P505


| Optimizer model (typical module compatibility) | P320 (for 60-cell modules) | P340 (for high-power 60-cell modules) | P370 (for higher-power 60 and 72-cell modules) | P400 (for 72 & 96-cell modules) | P405 (for thin film modules) | P505 (for higher current modules) | |
|---|---|---|---|---|---|---|---|
| **INPUT** | | | | | | | |
| Rated Input DC Power[1] | 320 | 340 | 370 | 400 | 405 | 505 | W |
| Absolute Maximum Input Voltage (Voc at lowest temperature) | 48 | | 60 | 80 | 125[2] | 83[2] | Vdc |
| MPPT Operating Range | 8 - 48 | | 8 - 60 | 8 - 80 | 12.5 - 105 | 12.5 - 83 | Vdc |
| Maximum Short Circuit Current (Isc) | 11 | | | 10.1 | | 14 | Adc |
| Maximum DC Input Current | 13.75 | | | 12.63 | | 17.5 | Adc |
| Maximum Efficiency | 99.5 | | | | | | % |
| Weighted Efficiency | 98.8 | | | | | 98.6 | % |
| Overvoltage Category | II | | | | | | |
| **OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)** | | | | | | | |
| Maximum Output Current | 15 | | | | | | Adc |
| Maximum Output Voltage | 60 | | | | 85 | | Vdc |
| **OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)** | | | | | | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | | | | | | Vdc |
| **STANDARD COMPLIANCE** | | | | | | | |
| EMC | FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3 | | | | | | |
| Safety | IEC62109-1 (class II safety), UL1741 | | | | | | |
| RoHS | Yes | | | | | | |
| **INSTALLATION SPECIFICATIONS** | | | | | | | |
| Maximum Allowed System Voltage | 1000 | | | | | | Vdc |
| Compatible inverters | All SolarEdge Single Phase and Three Phase inverters | | | | | | |
| Dimensions (W x L x H) | 129 x 153 x 27.5 / 5.1 x 6 x 1.1 | | | 129 x 153 x 33.5 / 5.1 x 6 x 1.3 | 129 x 159 x 49.5 / 5.1 x 6.3 x 1.9 | 129 x 162 x 59 / 5.1 x 6.4 x 2.3 | mm / in |
| Weight (including cables) | 630 / 1.4 | | | 750 / 1.7 | 845 / 1.9 | 1064 / 2.3 | gr / lb |
| Input Connector | MC4[3] | | | | | | |
| Output Wire Type / Connector | Double Insulated; MC4 | | | | | | |
| Output Wire Length | 0.95 / 3.0 | | 1.2 / 3.9 | | | | m / ft |
| Input Wire Length | 0.16 / 0.52 | | | | | | m / ft |
| Operating Temperature Range | -40 - +85 / -40 - +185 | | | | | | °C / °F |
| Protection Rating | IP68 / NEMA6P | | | | | | |
| Relative Humidity | 0 - 100 | | | | | | % |

[1] Rated STC power of the module. Module of up to +5% power tolerance allowed
[2] NEC 2017 requires max input voltage be not more than 80V
[3] For other connector types please contact SolarEdge

| PV System Design Using a SolarEdge Inverter[4][5] | | Single Phase HD-Wave | Single phase | Three Phase 208V | Three Phase 480V | |
|---|---|---|---|---|---|---|
| Minimum String Length (Power Optimizers) | P320, P340, P370, P400 | 8 | | 10 | 18 | |
| | P405 / P505 | 6 | | 8 | 14 | |
| Maximum String Length (Power Optimizers) | | 25 | | 25 | 50[6] | |
| Maximum Power per String | | 5700 (6000 with SE7600-US - SE11400-US) | 5250 | 6000[7] | 12750[8] | W |
| Parallel Strings of Different Lengths or Orientations | | Yes | | | | |

[4] For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
[5] It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string
[6] A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
[7] For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W
[8] For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W



CE RoHS

D
03/14/2023

TITAN SOLAR POWER

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**CUSTOMER INFORMATION**

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AHJ:NC-COUNTY HARNETT

UTILITY:SOUTH RIVER ELECTRIC MEMBERSHIP CORPORATION

PRN NUMBER: TPS-54899

ILLUMINE

OPTIMIZER SPECSHEET

| | |
|---|---|
| DRAFTED BY: K.UTKARSHA<br>QC'ED BY: A.N.KRISHNAN | PAPER SIZE:17"X11" |
| SCALE:AS NOTED | REV:D |
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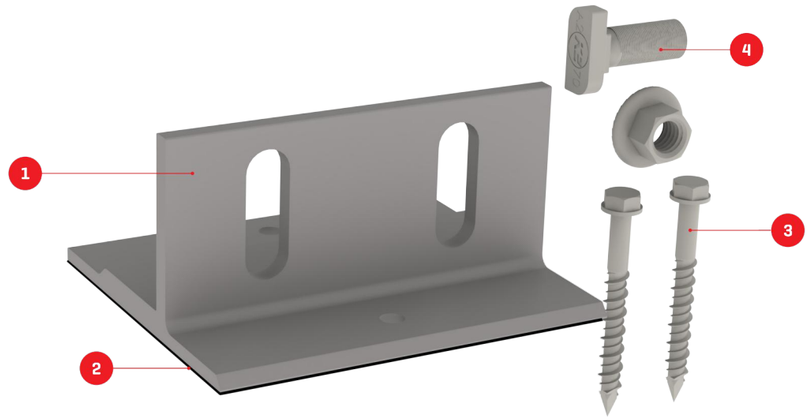
# SPEC SHEET

We support PV systems
Formerly Everest Solar Systems




# Splice Foot X

## TECHNICAL SHEET

| Item Number | Description | Part Number |
|---|---|---|
| 1 | Splice Foot X | 4000113 \| Splice Foot X Kit, Mill |
| 2 | K2 Solar Seal Butyl Pad | |
| 3 | M5 x 60 lag screws | |
| 4 | T-Bolt & Hex Nut Set | |

### Technical Data

| | Splice Foot X |
|---|---|
| Roof Type | Composition shingle |
| Material | Aluminum with stainless steel hardware |
| Finish | Mill |
| Roof Connection | M5 x 60 lag screws |
| Code Compliance | UL 2703 |
| Compatibility | CrossRail 44-X, 48-X, 48-XL, 80 |

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ILLUMINE

MOUNT SPECSHEET

| | |
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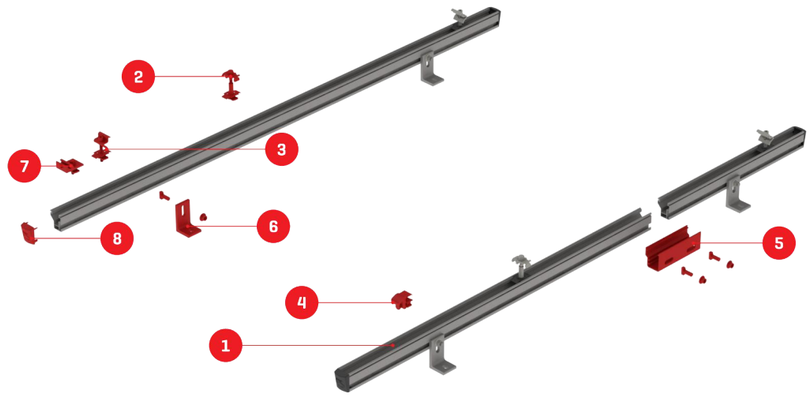
SPEC SHEET

## CONNECTING STRENGTH




# CrossRail System

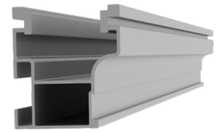
## TECHNICAL SHEET

| Item Number | Description | Part Number |
|---|---|---|
| 1 | CrossRail 44-X (shown) all CR profiles applicable | 4000019 (166" mill), 4000020 (166" dark) , 4000021 (180" mill), 4000022 (180" dark) |
| 2 | CrossRail Mid Clamp | 4000601-H (mill), 4000602-H (dark) |
| 3 | CrossRail End Clamp | 4000090 (silver), 4000091 (dark), 4000092 (silver), 4000093 (dark) |
| 4 | Yeti Hidden End Clamp for CR | 4000050-H |
| 5 | CrossRail 44-X Rail Connector (shown)<br>CR 48-X, 48-XL Rail Connector available | 4000051 (mill), 4000052 (dark) |
| 6 | L-Foot Slotted Set | 4000630 (mill), 4000631 (dark) |
| 7 | Everest Ground Lug | 4000006-H |
| 8 | CrossRail 44-X End Cap (shown)<br>CrossRail 48-X, 48-XL and 80 available | 4000067 |



## CONNECTING STRENGTH

## CROSSRAIL 44-X



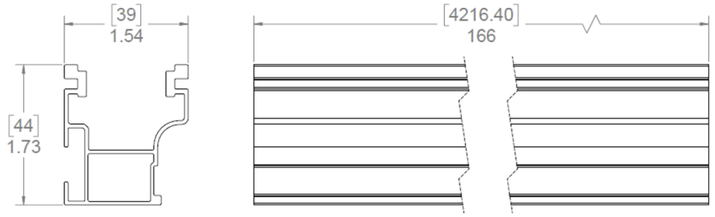
### Mechanical Properties

| | CrossRail 44-X |
|---|---|
| Material | 6000 Series Aluminum |
| Ultimate Tensile Strength | 37.7 ksi (260 MPa) |
| Yield Strength | 34.8 ksi (240 MPa) |
| Weight | 0.47 lbs/ft (0.699 kg/m) |
| Finish | Mill or Dark Anodized |

### Sectional Properties

| | CrossRail 44-X |
|---|---|
| Sx | 0.1490 in3 (0.3785 cm3) |
| Sy | 0.1450 in3 (0.3683 cm3) |
| A (X-Section) | 0.4050 in2 (1.0287 cm2 |

### Units: [mm] in




Notes:

- Structural values and span charts determined in accordance with Aluminum Design Manual and ASCE 7-16
- UL2703 Listed System for Fire and Bonding

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ILLUMINE

RAIL SPECSHEET

| | |
|---|---|
| DRAFTED BY:<br>K.UTKARSHA<br>QC'ED BY:<br>A.N.KRISHNAN | PAPER SIZE:17"X11" |
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